

### Claims

We claim:

- 1           1. A purified polynucleotide molecule, comprising a nucleotide sequence that encodes  
2           an oxalyl-CoA decarboxylase polypeptide, or a fragment of said oxalyl-CoA decarboxylase  
3           that retains functional enzymatic activity.
- 1           2. The polynucleotide molecule according to claim 1, wherein said nucleotide  
2           sequence is derived from *Oxalobacter formigenes*.
- 1           3. The polynucleotide molecule according to claim 1, wherein said nucleotide  
2           sequence encodes a polypeptide comprising the amino acid sequence shown in SEQ ID NO.  
3           4, or a fragment of said oxalyl-CoA decarboxylase that retains functional enzymatic activity.
- 1           4. The polynucleotide molecule according to claim 1, comprising the nucleotide  
2           sequence shown in SEQ ID NO. 3.
- 1           5. The polynucleotide molecule according to claim 1, wherein said polynucleotide  
2           molecule hybridizes under standard high-stringency conditions with a polynucleotide molecule  
3           comprising the nucleotide sequence shown in SEQ ID NO. 3, or the complementary sequence  
4           thereof.
- 1           6. The polynucleotide molecule according to claim 1, wherein said polynucleotide  
2           consists of a nucleotide sequence that encodes oxalyl-CoA decarboxylase comprising the  
3           amino acid sequence shown in SEQ ID NO. 4, or a fragment of said oxalyl-CoA  
4           decarboxylase that retains functional enzymatic activity.

1           7. The polynucleotide molecule according to claim 6, wherein said polynucleotide  
2 hybridizes under high stringency conditions with a nucleotide sequence comprising  
3 nucleotides 181 through 1884 of the nucleotide sequence shown in SEQ ID NO. 3 or the  
4 complementary sequence thereof.

1           8. The polynucleotide according to claim 6, wherein said nucleotide sequence consists  
2 of nucleotides 181 through 1884 of the nucleotide sequence shown in SEQ ID NO. 3 or the  
3 complementary sequence thereof.

1           9. A polynucleotide probe, comprising a nucleotide sequence that is substantially  
2 complementary with a polynucleotide sequence present in an *Oxalobacter formigenes*  
3 genome, wherein the polynucleotide sequence present in the *Oxalobacter formigenes* genome  
4 comprises a gene selected from the group consisting of the formyl-CoA transferase gene and  
5 the oxalyl-CoA decarboxylase gene.

1           10. A polynucleotide PCR primer, comprising a nucleotide sequence that is  
2 substantially complementary with a polynucleotide sequence present in an *Oxalobacter*  
3 *formigenes* genome, wherein said polynucleotide sequence present in said *Oxalobacter*  
4 *formigenes* genome comprises a gene selected from the group consisting of the formyl-CoA  
5 transferase gene and the oxalyl-CoA decarboxylase gene, and wherein said PCR primer is  
6 capable of priming PCR amplification of said polynucleotide sequence present in said  
7 *Oxalobacter formigenes* genome.

1           11. A method for detecting *Oxalobacter formigenes* in a sample, comprising the steps  
2 of:

- 3           (a) contacting said sample with a polynucleotide probe according to claim 9 under  
4 conditions sufficient for selective hybridization of said polynucleotide probe  
5 with a DNA fragment specific for *Oxalobacter formigenes*; and

6 (b) detecting said probe hybridized to said DNA fragment.

1 12. A polynucleotide vector comprising a polynucleotide molecule according to claim  
2 1.

1 13. The polynucleotide vector according to claim 12, wherein said polynucleotide  
2 molecule consists of a nucleotide sequence that encodes an oxalyl-CoA decarboxylase  
3 polypeptide comprising the amino acid sequence shown in SEQ ID NO. 4, or a fragment of  
4 said oxalyl-CoA decarboxylase that retains functional enzymatic activity.

1 14. The polynucleotide vector according to claim 12, wherein said polynucleotide  
2 vector hybridizes under high stringency conditions with a nucleotide sequence consisting of  
3 nucleotides 181 through 1884 of the nucleotide sequence shown in SEQ ID NO. 3 or the  
4 complementary sequence thereof.

1 15. The polynucleotide vector according to claim 12, wherein said nucleotide  
2 sequence of said polynucleotide molecule consists of nucleotides 181 through 1884 of the  
3 nucleotide sequence shown in SEQ ID NO. 3 or the complementary sequence thereof.

1 16. A recombinant host cell which comprises the polynucleotide vector of claim 12,  
2 and wherein said cell expresses said oxalyl-CoA decarboxylase or a fragment of said oxalyl-  
3 CoA decarboxylase that retains enzymatic activity.

1 17. The cell according to claim 16, wherein said polynucleotide vector hybridizes  
2 under high stringency conditions with a nucleotide sequence consisting of nucleotides 181  
3 through 1884 of the nucleotide sequence shown in SEQ ID NO. 3 or the complementary  
4 sequence thereof.

- 1           18. The cell according to claim 16, wherein said nucleotide sequence of said
- 2           polynucleotide molecule consists of nucleotides 181 through 1884 of the nucleotide sequence
- 3           shown in SEQ ID NO. 3 or the complementary sequence thereof.